



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

THE NAME "NEWARK" IN AMERICAN STRATIGRAPHY:

A JOINT DISCUSSION.

I.

MUCH time and ink have been wasted in discussing the claims of alternative stratigraphic names. In many instances controversies arise over questions of fact, but there are also numerous cases in which the facts are well understood, and individuals disagree only as to the bearing of the facts on the questions of nomenclature. Opinions differ so widely as to the principles which should determine the selection of names that facts which some regard as conclusive appear to others not at all pertinent. The road to ultimate peace lies through a war of principles; and the valuable controversy is one in which the fundamental postulates of the contestants are exposed. Holding this view of the general question, I would be understood as joining in the discussion of the term "Newark" only because a principle of stratigraphic nomenclature appears to be involved.

In a recent article B. S. Lyman says:

"For those rocks have, from their conformability throughout, and their predominant color, and a comparative lack of fossils through a great part of them, been commonly lumped together as only a single group, formation, or system, under the general name of New Red, or Triassic, or Jurassico-Triassic, or Rhætic. Nearly forty years ago, with the bold assurance born of ignorance, perhaps quite pardonable at that time, the special name of Newark group was proposed for the whole lot, from one of its most striking local economic features, though otherwise an extremely subordinate one, and even economically perhaps inferior to the Richmond coal; and latterly there has been an effort to revive the name, long after it had fallen into well-merited oblivion."¹

I am one of those who have seconded Russell's proposal to revive the name "Newark,"² and despite the brief argument

¹ Proc. Am. Phil. Soc., Vol. 31, p. 314.

² Am. Geol., Vol. 3, 1889, pp. 178-187.

which accompanies Lyman's protest, I am at present of opinion that the needs of geologists are better served by Newark than by New Red, Jurassic, Jurassico-Triassic, or Rhætic.

It may be assumed that there is no difference of opinion as to the propriety of giving local geographic names to the minor stratigraphic units. Such is the modern practice of most geological surveys, and it has the sanction of the International Congress of Geologists. Lyman, too, in the paper cited, introduces Pottstown shales, Lansdale shales, Norristown shales, Perkasio shales and Gwynedd shales as the names of newly recognized formations in eastern Pennsylvania and the contiguous parts of New Jersey, deriving the distinctive word in each case from the local geography. The stratigraphic units thus distinguished are all parts of the larger unit to which Redfield applied the local geographic name "Newark."

But Lyman protests against the use of the local name for the larger unit. It is not entirely clear to me whether he holds that the larger unit should have no name, or that it should not have a local name, or only that it should not receive the particular local name; and I therefore find it easier to state the basis of my own opinion than to discuss his view.

1. In my opinion *the larger unit should have an individual name*.—In the nomenclature of stratigraphy, as in language generally, it is advantageous to avoid paraphrases by giving a short name to every concept which needs frequently to be expressed. That for which Redfield proposed the name "Newark group"¹ is a stratigraphic integer, so definitely limited in nature that its individuality has been recognized in the literature of a half century. In the paper just referred to it is distinctly recognized by Lyman, who calls it in one place "the older Mesozoic rocks of New Jersey," and elsewhere "the older Mesozoic," "the so-called New Red," "the New Red beds," "the New Red." Each of these terms is used as a name rather than as a description; even the long phrase "the older Mesozoic rocks of New Jersey" is not a definition, for it is made to cover rocks, for example, the

¹ Am. Jour. Sci., 2nd ser., Vol. 22, 1856, p. 357.

Richmond coal, which are not in New Jersey. The unit is peculiarly definite in that its lower and upper limits are marked by conspicuous unconformities, while its strata are everywhere conformable with one another. Its composition, though not uniform, is so little varied that attempts to unravel its stratigraphy and structure have been successful in but few districts.

2. *The name should include a local geographic term.*—In the nomenclature of historic geology there are two parallel sets of terms, the one representing larger or smaller bodies of strata, the other representing larger or smaller divisions of geologic time. As the divisions of geologic time are based upon the classification of strata, their names have been mostly derived from stratigraphy, and there are many circumstances under which it is a matter of indifference whether a given term be construed in its stratigraphic or in its chronologic sense. Partly in this way there has arisen a widely prevalent habit of confusing strata and time. This confusion has an unfortunate influence on the treatment of problems of correlation, as it leads to language implying that the stratigraphic units of distant lands, for example, Europe and America, are the same. As I understand the case each portion of the general geologic time scale was based upon the stratigraphy of some district, usually in Europe. Correlation at a distance, for example, in America, does not determine the existence in America of the European formations, but only the existence of local formations deposited (in whole or part) in the same portions of geologic time. Or, in other words, correlation arranges the formations of a country in accordance with a standard time scale.

When the time relations of a formation or other stratigraphic unit are unknown or are imperfectly known, a name derived from the time scale can be employed only provisionally. As knowledge of fauna and flora increases, opinions change as to time relations, and experience shows that at any stage in the accumulation of paleontologic data conflicting opinions may be held by different students. Time names are thus unstable; but a geographic name, depending as it does on simple relations readily

ascertained, is permanent. The rocks in question well illustrate the confusing synonymy which arises from the employment of time names. They have been called at various times and by various writers : Silurian, Old Red, Carboniferous, Lower Carboniferous, Permian, Upper Permian, Mesozoic, Older Mesozoic, Secondary, Middle Secondary, New Red, Trias, Jura-Trias (and synonyms), Keuper, Upper Trias, Rhætic, Lias, Inferior Oolite, and Oolite.

When the chronological relations of a stratigraphic unit have been established, it becomes proper to apply to it the title of any time division including its period of formation ; but the need for a local stratigraphic name, or, in other words, an individual name, does not cease. The place of the Hamilton group in the time scale is so well known that it is properly called Devonian and Paleozoic, but the local name Hamilton is still useful.

In the conceivable case of a formation or group representing the whole of a division of the time scale and no more, there might be a question of the need of a local name. But the existence of such a case has not been demonstrated, and it must be admitted that in the great majority of instances the local stratigraphic units are incommensurate with the standard time units. The body of rocks under consideration is imperfectly supplied with fossils, and little is known of the relations of its fossiliferous horizons to one another and to the upper and lower limits of the series. No one asserts that its period of formation was coëxtensive with any of the time divisions whose names have been provisionally applied to it. Opinions as to the interpretation to be given to its fossils are still divergent, and the only name which can be conveniently used by all is one which avoids the question of correlation. A local geographic name meets this requirement.

There are valid objections to a paleontologic or a purely petrographic name, but as such have not been proposed the objections need not be stated.

3. *The proper geographic term is Newark.*—Prominent among the qualifications of a geographic term for employment in strati-

graphy are (1) definite association of the geographic feature with the terrane, (2) freedom of the term from preoccupation in stratigraphy, (3) priority. The rule of definite association is satisfied if the geographic feature, being a town or district, is wholly or partly underlain by the terrane, or if, being a stream, it crosses the terrane. Preferably the portion of the terrane thus associated should be petrographically and paleontologically characteristic, but this consideration yields to priority.

The "Newark" rocks underlie the City of Newark, exhibiting typical phases of sandstone and shale and containing some fossils. The only other rocks present are of widely different character, being Pleistocene. The name Newark has been applied to no other terrane. It is the earliest geographic name proposed for this terrane.¹

G. K. GILBERT.

II.

MR. GILBERT has very kindly invited me to answer his argument: (1) that the so-called Newark system ought to have a name, because it is a stratigraphic integer, or unit; (2) that a stratigraphic name ought to include a local geographical term; and (3) that the name Newark is the proper one, because of (a) the definite association of that geographical feature with the rock beds in question, (b) the freedom of the term from preoccupation in stratigraphy, and (c) its priority.

1. He considers that the stratigraphic unit is peculiarly definite from the conspicuous unconformities at top and bottom, while internally it is conformable throughout with little varied composition.

In eastern Pennsylvania, where the rock beds have been studied with some small approach to thoroughness, the composition is found sufficiently varied to justify at least five very conspicuously marked subdivisions of several thousand feet each. Almost all the fossils hitherto used for inferring the age of the

¹ See *American Geologist*: Russell, Vol. 3, p. 181, and Vol. 7, pp. 238-241; Hitchcock, Vol. 5, p. 201.

beds appear to have come from a single one of those subdivisions, one quite above the rocks of Newark, and the same that contains the Richmond coal. That coal, Gilbert says, does not occur in New Jersey, meaning, perhaps, not in large deposits like the Virginian; but yet no doubt it occurs there in thin layers and traces, just as in Pennsylvania, since the same subdivision of rock beds does extend into New Jersey. It is, perhaps, uncertain whether the Newark rocks, with their two reported fossil species, belong even to the Mesozoic.

There is in eastern Pennsylvania and New Jersey great unconformity at the top and bottom of the rocks in question; but it is not yet so certain that beds of the same age as the lowest of them do not occur conformable to Paleozoic beds in western Pennsylvania and elsewhere in eastern America, to say nothing of the West.

Clearly no claim for unity in the supposed group could be based on geographical continuity.

Would it not, indeed, be still more reasonable if he maintained that the Paleozoic rocks of the Appalachian region were a stratigraphic integer or unit, and consequently deserved a separate name?

2. There are, in truth, strong arguments in favor of generally giving local geographical names to stratigraphical groups, whether large or small. Yet there are many names of a different character that have had merit enough to become universally accepted, such as Paleozoic, Mesozoic, the Old and New Red Sandstones, Trias, Oolite, Calciferous, Corniferous, Saliferous, Carboniferous, Coal Measures, Millstone grit, Cretaceous chalk, Eocene and the like. Of course, the larger the group, the less easy to find a suitable, well-characterizing local name, the name of a place or region where the beds have been particularly studied, or much seen of men, or, as a whole, finely displayed; and that would be a difficulty with so extensive a set of beds as the one in question.

3. Gilbert, while insisting that Newark is the proper term in the present case, evidently admits that some such geographical

names are more suitable than others, requiring at least definite association with the rock beds, freedom from preoccupation, and priority.

The definite association he requires seems to be very slight; namely, the occurrence at Newark of perhaps one-tenth or one-twentieth of the beds to be included in the name, and with only two determined fossil species, plants. Suppose, in rummaging among old periodicals of forty years ago, a foot-note by some Baltimore collector were found, suggesting, without any attempt at either stratigraphic or geographical delimitation, that the whole body of Appalachian Paleozoic rocks be called the Cockeysville group, because, forsooth, the Paleozoic marble quarries there supply the city with fine building material; would not the argument for the revival of the name be quite as strong as in the almost precisely parallel case of Newark?

As to priority, and even preoccupation, and suitableness, too, is it not with geologists the same as with everybody else, that words, after all, are only used for the sake of being understood, and those words are to be used that will be most readily understood, so that currency, usage, is really the main criterion?

—Usus

Quem penes arbitrium est et jus et norma loquendi.

It is a great fundamental principle, that with the lapse of thousands of years has become more and more firmly established.

The rule of priority is an excellent one for cases otherwise doubtful or indifferent; but surely we should not be sticklers for it to the extent of raking up a name like Newark, that was unsuitable in the beginning, never did find acceptance, and was long ago wholly obsolete.

BENJAMIN SMITH LYMAN.

PHILADELPHIA, December 11, 1893.